

Turbo Code was specifically designed for TTY/TRS use and has several unique attributes which can further reduce relay call time. As an example, Turbo Code is automatic. It is not dependent on the TTY user to remember to turn it on. The opportunity for improved performance is always active. Only a small percentage of ASCII calls are made to relay, partly because it takes a conscious effort on the part of the TTY user to make an ASCII call. The user must specifically know they want to do so and set the proper speed, parity, stop bit, and duplex settings. With Turbo Code, the technology is engaged whenever available, thus all Turbo Code equipped users benefit whenever Turbo Code is available.

Another attribute of Turbo Code is interrupt capability which can significantly reduce the time of a relay call by eliminating unnecessary conversation. Voice telephone users often interrupt each other during a conversation, thus speeding the exchange of information. Traditional Baudot does not allow the CA or the user to interrupt the conversation, thus many conversations drag on until the originating party is totally finished. By using interrupt, a user can ask the originator to move on to another topic, thereby saving whole sections of conversation similar to the way voice users do.

Another time saving attribute of Turbo Code is direct calling., which allows the user to dial on their TTY the number of the party they are calling, push one button on their TTY, and connect to their party through TRS with no interaction with the CA. This saves virtually all of the “set-up” time for the call. It also eliminates the inconvenient and unnatural “call within a call” required in traditional TRS operation. This is a great time saver for both the user and for the relay and provides a level of service that much more closely approximates that of the voice telephone network.

Enhanced Turbo Code equipped TTYs are capable of storing user specific data (the user has total control over this data) which is automatically transmitted to the relay at the beginning of a call, so that the relay may profile automatically from the user’s TTY rather than from the user’s telephone number. This allows TTY users to take their profile along as they travel or change the location of their TTY equipment, thus speeding the set-up with the relay no matter where the user is calling from. This attribute also allows each user control over her/his profile so that s/he may change it from time to time, according to individual needs and preferences.

2. Availability and Cost of Turbo Code

Turbo Code utilizes the same frequencies as traditional Baudot, which were accurately chosen by Robert Weitbrecht as the best frequencies to send and receive low speed data over acoustically coupled telephone lines. These frequencies also allow Turbo Code to be built into TTYs at little or no additional cost because the same circuitry may be employed to enable both traditional Baudot/Weitbrecht and Turbo Code. Turbo Code is supplied free in all new Ultratec TTYs.

Ultratec is also a TRS equipment supplier. Turbo Code capability is included in Ultratec's InteleRelay equipment as part of the cost of providing the equipment. There is no additional charge for Turbo Code.

For relays that use non-Ultratec TRS equipment, Turbo Code is available through a licensing agreement or for a small monthly fixed fee. Due to the reduced time of a Turbo Code call, the relay administration will actually save many times this cost, since using Turbo Code can save from 10% to 45% of the time to make a call. Even the relay users themselves save money out of their own pocket due to lower charges for shorter long distance calls.

C. High Speed Transcription Technology (Fastran)

In order to achieve real-time relay, there not only needs to be protocols and user devices that are capable of supporting the faster data transmission rates, but there also needs to be a method by which spoken information can be transcribed into text in real-time. Mandating faster typing speeds may be an interim step towards achieving functional equivalence, but will not be sufficient in achieving true real-time equivalence.

The world record for typing was set many years ago and was only in the 150 words per minute range. Even this astonishing accomplishment could not be kept up for very long by the record holder. Only when the transcription rate is able to keep up with the natural speed of speech will real-time relay become a reality.

Ultratec has experimented with a number of methods of achieving high speed transcription with promising results. Using a unique method which combines voice recognition, typing, and several other technologies, Ultratec has developed transcription systems that will allow a CA with relatively modest typing skills to achieve transcription speeds in excess of 100 words per minute with optimal spelling and word for word accuracy. Ultratec has named this technology “Fastran”, short for Fast Transcription.

As technologies like Fastran become available, true real-time relay becomes a realizable objective without the need to increase CA typing speed requirements. Ultratec urges the FCC to encourage the development and use of this new kind of transcription technology in TRS to help attain true real-time relay service.

D. TTY Protocols, Industry Standards and Compatibility

Currently there are three major protocols used in TTYs in the United States: Baudot/Weitbrecht, ASCII Bell 103, and Enhanced TTY Protocol (Turbo Code). Virtually all TTYs in North America have Baudot/Weitbrecht capability. Ultratec estimates that Turbo Code is the next most widely used enhanced protocol followed by ASCII.

Baudot, being the original protocol of the North American TTY network, is present in all new Ultratec TTYs being produced.

The population of Turbo Code equipped TTYs is also growing primarily because Turbo Code costs the consumer nothing to have included in their TTY, Turbo Code is totally transparent to the user in terms of ease of use, and Turbo Code is becoming widely accepted due to its enhanced communication capabilities

compared with Baudot and its lack of inherent problems such as disconnects and set-up complexities and problems which are present with ASCII.

The demand for ASCII equipped TTYs is less than 10% of all TTYs currently being produced by Ultratec apparently due to their increased cost (retail is \$39 to \$79 more per unit), they are considerably more complex to use, and there is little acceptance or use of ASCII in the TTY network due to disconnects and set-up problems. Many state programs are now asking for simpler, non-ASCII equipped TTYs because training users to use ASCII is far more complex and the actual use of ASCII is very limited.

Ultratec supports the concept of maximum compatibility between all TTYs and between TTYs and TRS equipment so that all TTY users may take advantage of the benefits of TRS and of new technologies as they become available. Clear guidelines for Baudot/Weitbrecht and ASCII Bell 103 protocols have long been established and are readily available to all providers of TTY equipment and services. The specifications for Turbo Code and the guidelines regarding its use are also well defined and available from Ultratec through licensing agreements. Because all of these protocols are well defined, uniform, and all of the necessary detailed information on their implementation is available in accordance with

universally accepted business practices, Ultratec believes that TTY protocol standards are adequately established at this time.

VII. Conclusion

Relay services have made a tremendous impact on people's lives throughout the country by allowing TTY users to call anyone, whether they have a TTY or not. Despite the wonderful service it provides, Relay has not yet gained widespread acceptance due to its limitations. Even simple Relay calls can take far longer than voice calls. There can be long pauses or delays in conversation with no way to interrupt people during a call. Many of these frustrations are due to old-fashion and unnecessarily complex technology, which limits the appeal of Relay to a wider population.

Ultratec feels the FCC should encourage the use of new and useful technologies to ensure the intent of Congress for those who rely on text telephones and other forms of visual communications, to gain real-time functional equivalence within our telephone network. It is imperative that the FCC take a strong stand for the use of technological solutions and advances as they become available. However, Ultratec does not encourage the FCC to mandate the use of

any specific technology nor should the FCC limit the technologies that TRS may use to promote better and more functionally equivalent service. Ultratec encourages the FCC to consider expanding the cost recovery mechanism provision to incorporate implementation of voice recognition applications such as Fastran to reach untapped and under served segments of the intended population.

Ultratec encourages the FCC to explore means of bringing about a truly consumer-driven competitive TRS environment, and to assure a cost effective, functionally equivalent service for those who must rely on this avenue of accessing our nation's voice-based telecommunications network.

Respectfully submitted,

Pamela Holmes, Director
Consumer & Regulatory Affairs

Ultratec, Inc.
450 Science Drive
Madison, Wisconsin 53711

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